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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/667,113

09/18/2003

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EXAMINER

ERDEM, FAZLI

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/667,113	Applicant(s) BARLOCCHI ET AL.	
	Examiner FAZLI ERDEM	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-13, 15-19, 21 and 28-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-13, 15-19, 21 and 28-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/11/2008 has been entered.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, claim 8's "epitaxial growth formed in the at least one trench to fill the at least one trench" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8-13 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 8-13 include a requirement of "epitaxial growth formed in the at least one trench to fill the at least one trench". However, in the application as filed none of the drawings, the specification, or the original claims disclose such a limitation in a manner sufficient to convey to one of skill in the art that applicant was in possession of an invention including this limitation.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sidner et al (4,945,769) in view of Mirza et al. (5,883,420).

Regarding Claim 8, Figs. 2E and 2G disclose a structure formed in a substrate of monolithic semiconductor material 20, the structure comprising: at least one trench 26 formed in the substrate, the at least one trench having an open top and an open bottom, and a coating 30 on the lateral walls of the at least one trench with material resistant to etching a cavity having walls formed below each at least one trench and a cavity 32 having walls formed below each of at least one trench and having an open top in communication with the open bottom of the at least one trench, an epitaxial layer 14 formed in communication with the open bottom of the at least one trench, and a coating on the walls of the cavity with material inhibiting epitaxial growth; and an epitaxial layer 14 of semiconductor material formed on the substrate 20 to cover the open top of the trench and the epitaxial grown formed in the at least one trench to fill the at least one trench and to encase the cavity in the substrate. Sidner et al. fail to disclose the required coating on the walls of the cavity. However, Mirza et al. disclose a

semiconductor device where in Figs. 1-3, cavity 13/14 has coating 19 on the walls.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required coating on the walls of cavity in Sidner et al. as taught by Mirza et al. in order to have a semiconductor device with better insulation and reliability.

Regarding Claim 9, Figs. 1-3 of Mirza et al. disclose plurality of cavities 13/14.

Regarding Claim 10, Mirza et al. disclose the formation of cavities at different levels as disclosed in column 2

Regarding Claim 11-13, Mirza et al. disclose different cross-sectional configurations in column 2.

7. Claims 15-18, 28, 29, 32 and 33 rejected under 35 U.S.C. 102(b) as being anticipated by Mirza et al. (5,883,420).

Regarding Claim 15, in Figs. 1-3, Mirza et al. discloses a monolithic/monocrystalline wafer of semiconductor material 11, comprising: a plurality of buried cavities 13/14 formed in and completely surrounded by the monolithic semiconductor material 11, each cavity of the plurality of buried cavities having only one coating 19 on at least one wall thereof consisting of a layer of oxide material inhibiting epitaxial growth.

Regarding Claim 16, each cavity of the plurality of buried cavities 13/14 are formed parallel to one another and at a right angle with respect to a drawing plane of the semiconductor material.

Regarding Claim 17, plurality of cavities 13/14 are formed at the same height.

Regarding Claim 18, each of the cavities 13/14 of the plurality of cavities are formed at a different level in the semiconductor material (See column 2)

Regarding Claim 28, in Figs. 1-3, Mirza et al. disclose a wafer of monolithic monocrystalline semiconductor material 11, comprising a plurality of buried cavities 13/14, each cavity completely surrounded by said monolithic monocrystalline material 11 and each cavity having walls 19 covered with a single coating formed of a layer of material inhibiting epitaxial growth, the plurality of I buried cavities positioned adjacent to each other and separated from each other by dividers, 19.

Regarding Claim 29, layer 19 is oxide.

Regarding Claim 32, in Figs. 1-3, Mirza et al. disclose a monolithic wafer of monocrystalline semiconductor material 11, comprising a plurality of buried cavities 13/14, each cavity completely surrounded by said monocrystalline material and having walls 19 that are covered with a single coating that is formed of a layer of material inhibiting epitaxial growth, the plurality of buried cavities positioned at different heights within the wafer of monocrystalline semiconductor material as disclosed in column 2.

Regarding Claim 33, layer 19 is oxide.

Claim Rejections - 35 USC § 103

Art Unit: 2826

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30, 31, 34 and 35 rejected under 35 U.S.C. 103(a) as being unpatentable over Mirza et al. (5,883,420) in view of Beyer et al. (4,528,047)

Regarding Claims 30, 31, 34 and 35, in Figs. 1-3, Mirza et al. discloses a monolithic/monocrystalline wafer of semiconductor material 11, comprising: a plurality of buried cavities 13/14 formed in and completely surrounded by the monolithic semiconductor material 11, each cavity of the plurality of buried cavities having only one coating 19 on at least one wall thereof consisting of a layer of oxide material inhibiting epitaxial growth. Mirza et al. fail to disclose the cavity/trench coat/liner structures to be TEOS or nitride. However, Beyer et al. disclose a method for forming a void-free isolation structure utilizing etch and refill techniques where in Figs. 3 and 4, nitride coat/liner 30 and TEOS coat/liner 31 are disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required nitride/TEOS liner/coat in Mirza et al. as taught by Beyer et al. in order to have a semiconductor structure with better isolation.

1. Claims 19 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Mirza et al. (5,883,420) in view of Sidner et al. (4,945,769)

Regarding Claim 19, in Figs. 1-3, Mirza et al. disclose a structure formed in a substrate of monolithic semiconductor material 11, the structure comprising: a cavity 13/14 formed in and surrounded by the monolithic semiconductor material, the monolithic semiconductor material 11 comprising a membrane 17 formed on the semiconductor material 11. Mirza et al. fail to disclose the membrane have the required distance. However, Sidner et al. disclose a semiconductor device where in Fig. 1, semiconductor substrate 12 having membrane portion 14 monolithically integrated and part of the semiconductor substrate 12 having a thickness of between 1-10 microns.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required membrane portion in Mirza et al. as taught by Sidner et al. in order to have a semiconductor sensor structure with ease of manufacture and reduced geometry.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FAZLI ERDEM whose telephone number is (571)272-1914. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FE
July 29, 2008

**/Thomas L Dickey/
Primary Examiner, Art Unit 2826**